STAT

(1) (2) (3) (separate copy) (5) File.

April 27, 1964

Stellar Comparator

STAT

STAT and I visited STAT to get some background information on the use of a laser as the measuring device in the STAT stellar comparator. We talked to STAT Senior Staff Scientist; STAT Assistant to the Director; and STAT customer relations.

STAT reviewed some of the fundamentals of the Spectra Physics lasers with particular reference to the resonance features important to the interferometry techniques used in the measuring devices. Interferometry is sensitive business and needs precise adjustment to work.

STAT pointed out that a laser will not only resonate at its principal mode at a precise wavelength, but will also resonate at sidebands which have a very slightly different wavelength. The sidebands in effect produce noise on the interference bands and should be suppressed if possible. This can often be accomplished by reducing the intensity of the laser beam. This produces insufficient stimulation to excite the sidebands. The use of the short 13 inch laser was proper since it had fewer sidebands.

STAT suggested four things which could be done as practical improvements in the use of the laser:

1. Carefully adjust the hemispherical resonator on the laser to obtain full spatial coherence across the laser beam.

2. Reduce the intensity of the beam to the minimum usable value in an attempt to suppress the side bands.

3. Use a high pass filter in the detecting circuit to eliminate the low frequency fluctuations introduced by the power supply.

4. Move the laser back and forth along the light path to insure that 10 inch measuring travel was centered in the most sensitive portion of the beam.

The people at STAT were reassuring in that they considered the concepts in the use of the laser as a measuring tool to be sound. Of course they could give no opinion on the detail execution.

STAT

STAT